

APPENDIX B.4 KANKAKEE SERVICE AREA

ELEMENT 1. SERVICE AREA DESCRIPTION



The Kankakee Service Area (SA) is located in northwestern Indiana and is composed of the following two 8-digit HUCs which form the Kankakee River Basin:

- 07120001 - Kankakee
- 07120002 - Iroquois

The Kankakee SA includes all or portions of thirteen Indiana counties listed below in the Lake Region and Northern Moraine physiographic region.

Lake	Kosciusko	White
Porter	Marshall	Benton
LaPorte	Starke	Newton
St. Joseph	Pulaski	Jasper
Elkhart		

The Kankakee River Basin drains 1,913,059 acres within northwestern Indiana and is located in the Central Corn Belt Plains and Northern Indiana Drift Plains ecoregions. The western portion of the SA is located in the Central Corn Belt Plains and is predominantly rural. The eastern portion is located in the Northern Indiana Drift Plains and is characterized by greater woodlands, lower relief, and less urban-industrial activity than the western portion of the SA (U.S. EPA: Ecoregions of Indiana). The basin as a whole is characterized by its flat to rolling landscape and the channel of the Kankakee River valley which includes man-made drainage ditches and small areas of natural lakes and wetlands (IDNR DOW Assessment, 1990).

The primary major rivers within the SA are the Kankakee, Yellow, and Iroquois Rivers. Originating near South Bend, the Kankakee River flows southwest toward Illinois where it is joined with the Iroquois River, traveling west where it then converges with the Des Plaines River in Illinois to form the Illinois River.

Based on the 2011 NLCD, the land cover type with the most area in the Kankakee SA is agricultural land use (75.8%), followed by forest and shrub/scrub (10.4%), developed and impervious land use (8.13%), and wetlands and open water (3.5%) (Homer, et al., 2015). Woody wetlands are the prominent wetland type and range from approximately 2.33% per the NWI to 2.45% per the 2011 NLCD. Emergent herbaceous wetlands range from 0.4% per the 2011 NLCD to 1.23% per the NWI.

ELEMENT 2. THREATS TO AQUATIC RESOURCES

Aquatic resource threats specific to the Kankakee SA have been identified using the same approach as the statewide portion of the CPF. The threats are presented in the order of the current predominance within the SA.

2.1 Section 404 Permitted Impacts

The Corps Section 404 permit data for impacts that required mitigation in the Kankakee SA from 2009 – 2015 was collected and analyzed (**Table 46**). According to the data, 37.5 acres of impacted wetlands and 8,601 linear feet of impacted streams required mitigation in the seven year time period.

The transportation and service corridor work type accounted for the most stream impacts (72.68%), followed by dam related activities (27.32%). There were no documented stream impacts requiring mitigation for agricultural land uses, development or energy production and mining for this time period.

The transportation and service corridor work type accounted for the most wetland impacts (86.58%), followed by development (8.04%), dam related activities (2.62%), energy production and mining (1.76%), and agricultural land use (0.99%). Locations of the permitted stream and wetland impacts are provided in **Figure 54**.

Work Type Category	Authorized Stream Impacts – Linear Feet	Percent Stream Impact per Category	Authorized Wetland Impacts - Acres	Percent Wetland Impact per Category
Agriculture	0	0.00%	0.372	0.99%
Dam	2,350	27.32%	0.983	2.62%
Development	0	0.00%	3.016	8.04%
Energy Production	0	0.00%	0.66	1.76%
Transportation	6,251	72.68%	32.47	86.58%
Grand Total	8,601	100.00%	37.5	100.00%

Table 46. Authorized 404 stream and wetland impacts requiring mitigation by work type category, 2009 – 2015

Source: USACE Louisville, Detroit and Chicago Districts

Kankakee Service Area

404 Permitted Aquatic Resource Impacts Requiring Mitigation

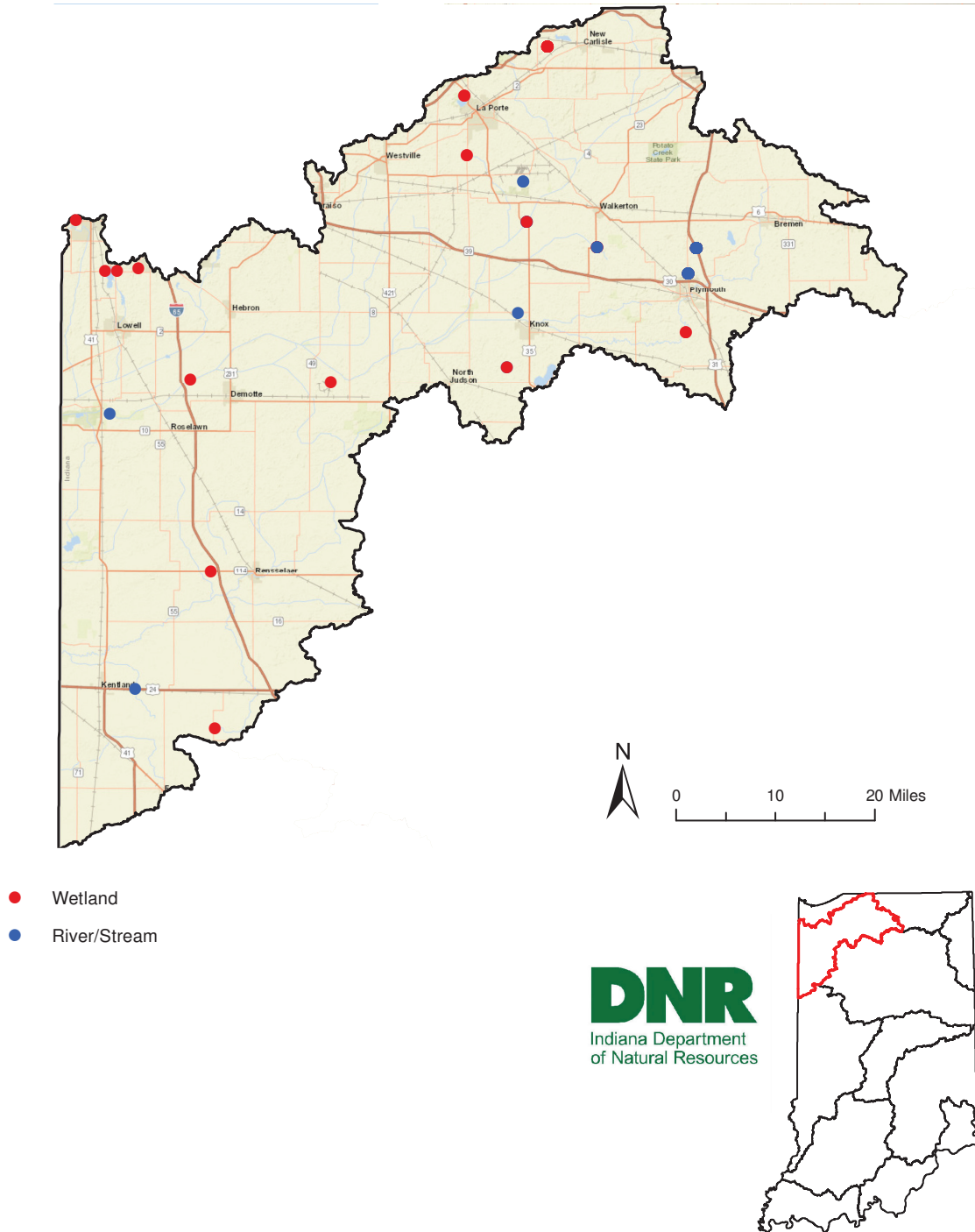


Figure 54. 404 permitted stream and wetland impacts requiring mitigation 2009- 2015

2.2 Land Cover and Land Use

In addition to 404 permitted work type categories, IDNR utilized the 2011 NLCD to identify land cover and land uses that contribute to aquatic resource and habitat impacts. Overall land cover within the Kankakee SA is presented in **Figure 55**, and displays the geographical relationship of converted cover types relative to naturally occurring cover types.

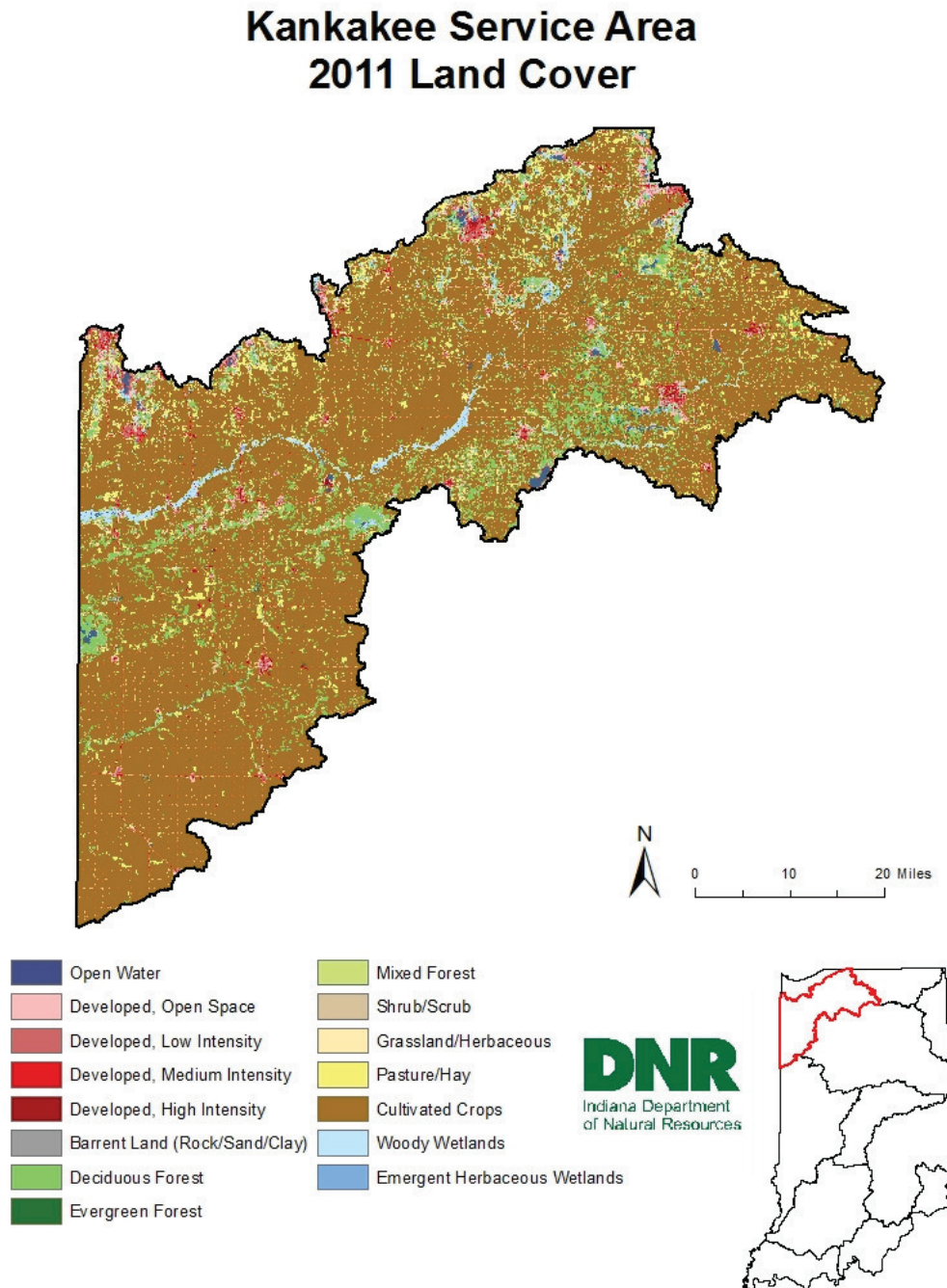


Figure 55. Land cover/use types for the Kankakee Service Area from the 2011 NLCD (Homer, et al., 2015)

The land uses exhibited within the 2011 NLCD include multiple classes of cover, and some have additional values within specific classes based on variants or intensities within the classification (**Table 47**).

Land Cover			
Class	Value	Sum of Acres	Percent of Total Acres
Open Water	*	13,110	0.69%
Developed	Open Space	70,543	3.69%
Developed	Low Intensity	68,227	3.57%
Developed	Medium Intensity	12,142	0.64%
Developed	High Intensity	4,417	0.23%
Barren Land (Rock/Sand Clay)	*	2,176	0.11%
Forest	Deciduous	181,059	9.47%
Forest	Evergreen	5,253	0.27%
Forest	Mixed	949	0.05%
Shrub/Scrub	*	11,743	0.61%
Grassland/Herbaceous	*	38,591	2.02%
Pasture/Hay (Agriculture)	*	68,969	3.61%
Cultivated Crops (Agriculture)	*	1,379,811	72.19%
Wetlands	Woody	46,809	2.45%
Wetlands	Emergent Herbaceous	7,642	0.40%
Grand Total		1,911,442	100%

Table 47. Kankakee land cover classification/value percentages from 2011 National Land Cover Database

* Class does not have additional values. (Homer, et al., 2015)

IDNR combined the values within the same land cover classification in **Figure 56** below to demonstrate the current overall land cover distribution of the SA.

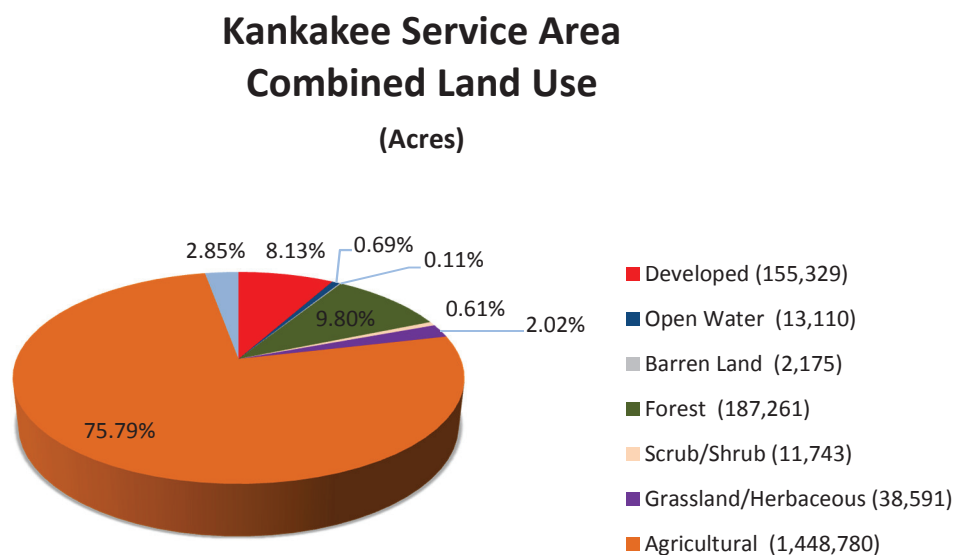


Figure 56. Combined land uses for the Kankakee Service Area from the 2011 NLCD (Homer, et al., 2015)

2.3 Agricultural Land Use

Agricultural land use is the largest land use category in the Kankakee SA. Total agricultural land use covers approximately 76% of the SA's total land area of 1,448,780 acres (Homer, et al., 2015).

Agricultural land uses occur throughout the SA, with the exception of the distribution of smaller developed areas.

Within the identified land use areas, cultivated crops comprise 1,379,811 acres (72.2%) and pasture/hay land cover 68,970 acres (3.6%) of the SA. Corn production is the primary cultivated crop, followed by soybeans based on acres of harvested crops from counties that comprise the majority of the Kankakee SA boundary (United States Department of Agriculture, 2016 and 2017).

Pasture/hay lands support livestock production for small to major livestock farming operations throughout the SA. The Kankakee SA contains active CFOs for pig, chicken, dairy cattle and beef cattle which have a minimum of 5,000 animal units with several operations surpassing the 15,000 animal unit threshold. Based on a statewide comparison, both Jasper and Newton County, located in the western portion of the Kankakee SA, contain by far the most dairy cattle CFO permits with more than 30,000 animal units each (Thompson, 2008). When combining these major agricultural land use activities, the Kankakee SA ranks fourth in percentage of total statewide land use (6.26%), but it is the most significant land use within the SA.

2.4 Growth and Development

Developed impervious area is the third largest land use after agricultural and forested cover, covering approximately 155,329 (8.13%) of the 1,911,442 total acres, tied for third least developed area density across SA's. In general, developed impervious areas are most concentrated along the northern border of the SA, consisting of communities in whole or part such as LaPorte, St. John, Cedar Lake, Lowell, Valparaiso and South Bend. Smaller footprints of high intensity development include communities such as Plymouth, Bremen, Knox and Fowler.

The SA contains portions of the Chicago/Gary, Michigan City-LaPorte, South Bend-Mishawaka, Elkhart-Goshen and Lafayette-West Lafayette MSA's, all of which experienced growth in the previous decade (Manns, 2013). In general, the cores of these MSA's are located mostly outside of the Kankakee SA boundary. For example, analysis of INDOT cities and towns GIS data indicates that only 8.4% of the City of South Bend's corporate limits are within the Kankakee SA. Approximately 59% (176,257 acres) of St. Joseph County's 295,156 acres are within the Kankakee SA, accounting for approximately 9% of total SA acres. However, approximately 66% (894,675 acres) of the Chicago/Gary MSA within Indiana is located within the SA, though more intensely developed in the north within the Calumet-Dunes SA. Approximately 76% (298,404 acres) of the Michigan City/LaPorte MSA is located in the SA, accounting for 16% of total SA acres. Analysis of the INDOT cities and towns GIS data shows the Kankakee SA contains all or part of 155 cities and/or towns, 33 of which are incorporated (INDOT, 2016).

Three Indiana regional councils overlap with the Kankakee SA which include the Kankakee-Iroquois Regional Planning Commission (KIRPC) (47%), Northwestern Indiana Regional Planning Commission (NIRPC) (31%), and the Michiana Area Council of Governments (22%) (IARC, 2017). The employment sectors with the most workers within the KIRPC are manufacturing (16%), government (14%), and retail/wholesale trade (14%), and agriculture (8%). A major economic development growth factor for the KIRPC region is its geographic location in close proximity to major MSAs such as Chicago (Gary), Michigan City-LaPorte, Lafayette, South Bend-Mishawaka and Indianapolis (KIRPC, 2010).

This proximity is ideal for growth in warehousing, manufacturing and shipping of goods to these sizeable markets. A number of the state and U.S. highways connect the region with important markets and allow for industrial growth. The KIRPC Region contains several industrial parks, ranging from fully developed to shovel-ready and/or informally planned (KIRPC, 2010).

Since 2000, other than Benton County, all counties have experienced population growth in the KIRPC region. According to NIRPC, while many communities in Lake and Porter counties (Calumet-Dunes SA) have experienced population decline in recent years, the southern portions of these counties within the Kankakee SA have seen population gains that include unincorporated areas in Porter County (NIRPC, 2011). NIRPC considers housing to be overbuilt in the south of the region within the Kankakee SA since there is considerable overall housing vacancies, though mostly in the urban core in the north (NIRPC, 2011).

Additionally, analysis of INDOT's local roads GIS data shows there are approximately 6,948 miles of municipal and county roads contributing to the developed impervious land cover within the SA (INDOT Road Inventory Section, 2016). The Kankakee SA ranks seventh among SA's in local road miles to square mile ratio with approximately 2.33 miles of local roads per square mile.

2.5 Transportation and Service Corridors

2.5.1 Roads

The Kankakee SA contains approximately 1,595 miles of U.S. Interstates and highways, 1,324 miles of state highways, and 6,948 miles of local roads within its boundary (INDOT Road Inventory Section, 2016). The concentration of roads per square mile of land and the overall size of the SA ranks near the middle when compared to all SAs; however, analysis of the specific road types reveals various rankings.

U.S. Interstates and highways have a concentration of approximately 0.53 mile per square mile, which ranks fourth when compared to the other ten SAs. Although the concentration of U.S. Interstates and highway miles per square mile fall within the top five, the concentration of state roads ranks ninth at 0.44 mile per square mile, making this the lowest ranking road type within the SA. In contrast, the concentration of local roads is approximately 2.33 miles per square mile, ranking seventh, when compared to all SAs. Similarly, the combined ranking of all roadways, ranks seventh, with concentration of 3.30 miles per square mile.

Although the concentration of state roads and local roads ranks near the middle, and state roads ranking near the bottom, closer analysis reveals the concentration of U.S. interstates and highways ranks near the top. The construction and maintenance of roads and bridges, throughout the Kankakee SA, support the predominant mode of transportation and play an integral role in sustaining business and commerce for the region.

2.5.2 Railroads

As an alternative mode of transportation, the Kankakee SA has 842 mile of railroads within the SA boundary (Federal Railroad Administration, 2002). These active railroads provide an important means of transportation for freight and passengers throughout the SA and state. The Kankakee SA is tied for the second highest concentration of railroads, with in the state, with a density of 0.28 miles of railroad per square mile.

The concentration of linear infrastructure throughout the SA poses a significant threat to aquatic resources in the form of habitat fragmentation, disruption to fluvial processes, resource degradation, habitat conversion and resource loss.

2.5.3 Service Corridors

Similar to threats associated with roads and railroads, the Kankakee SA contains service corridors which contribute to aquatic resource impacts and habitat loss associated with linear infrastructure. The SA contains over 3,224 miles of service corridors within its boundary.

The Kankakee SA contains an extensive network of large kilovolt (kV) electric transmission lines within its boundary. The large kV transmission lines identified within the SA include approximately 616 (12 kV) lines, sixteen (34.5 kV) lines, forty-three (345 kV), and fifteen (765 kV) lines (Indiana Geological Survey, 2001). These lines extend over 2,039 miles throughout the SA which makes it the second highest concentration of electric transmission lines relative to the SA size, resulting in 0.68 mile of transmission line per square mile.

In addition to electric transmission lines, the Kankakee SA contains over 1,185 miles of pipelines in total. It contains over 113 miles of pipelines that convey crude oil, 752 miles of pipelines that transport natural gas, and 320 miles of pipelines that deliver refined petroleum products (Indiana Geological Survey, 2002). When compared to the other SAs throughout the state, the Kankakee SA contains the sixth greatest concentration of crude oil pipelines and the fifth greatest concentration of natural gas and refined petroleum products pipelines.

2.6 Dams and Non-Levee Embankments

There are currently 6 known low head dams (IDNR DOW, 2016) within the SA, the third to lowest total in the state, but the lowest concentration at one low head dam per 498 square miles. There are currently 12 state regulated high head dams (IDNR DOW, 2016) documented within the SA at a density

of one dam per 249 square miles, the lowest concentration of all SA's, comprising 1% of documented high head dams statewide.

Per the NLE GIS analysis (IDNR, 2016), there are approximately 1,494,240 linear feet (283 miles) of NLE's mapped within the SA, averaging one mile of NLE per 11 square miles, the second highest concentration among all SA's. Approximately 158 miles of the NLE's are located within predominantly developed areas with the remaining 125 miles mapped in rural agricultural settings.

2.7 Energy Production and Mining Threats

2.7.1 Natural Gas and Oil Production

The Kankakee SA contains active oil and natural gas fields within its boundary. The Indiana Geological Survey (IGS) identifies eleven petroleum gas fields with eleven associated gas wells ranking the Kankakee SA fifth statewide for active natural gas and oil fields (Indiana Geological Survey, 2015). In addition, the IGS identifies two oil fields that include two active oil wells. The IGS petroleum well data identifies 45 abandoned gas wells, 170 abandoned oil wells, 614 dry wells, 9 abandoned salt water disposal wells, 3 abandon waste injection wells, 169 stratigraphic wells, 9 observation wells, 3 waste disposal wells, and 58 non-potable water supply wells within the SA boundary (Indiana Geological Survey, 2015).

2.7.2 Mineral Mining and Aggregates

The Kankakee SA contains active mineral mining operations that extract and produce aggregate commodities. Based on the Indiana Geological Survey (IGS) 2016 active Indiana industrial mineral production data, the SA contains ten sand & gravel mining operations and five crushed stone operations (Indiana Geological Survey, 2016). Although the Kankakee SA is the fifth largest SA, mineral mining within its boundary ranks seventh in the state with fifteen active operations.

2.7.3 Coal

The Kankakee SA does not have recoverable coal reserves and contains no active surface or underground coal mines.

2.8 Indiana State Wildlife Action Plan (SWAP) Identified Threats

The Kankakee SA shares the exact boundary with the Indiana SWAP Kankakee Planning Region. The SWAP identifies the most significant threats to habitats and SGCN with the Kankakee Planning Region as:

- Habitat conversion and loss
- Natural systems modification
- Invasive species
- Dams
- Fish passage
- Point and non-point source pollution
- Water management and use
- Housing and urban areas
- Commercial and industrial areas
- Agriculture, aquaculture, livestock
- Roads and service corridors
- Changing frequency, duration, and intensity of drought and floods

The SWAP Kankakee Planning Region has experienced loss in the majority of habitat types over the last decade mostly to urban development (SWAP, 2015).

2.9 Anticipated Threats

The existing land uses within the SA are agricultural and developed impervious footprints which make up approximately 84% of the land use within the SA, and are expected to remain as the top contributors to aquatic resource impairments. Agriculture remains an important economic sector in the region accounting for 9.8% of total earnings with the number of farms noticeably increasing (KIRPC, 2010).

IDNR expects transportation and service corridors along with development projects to remain the foremost permitted activities requiring mitigation for aquatic resource impacts if the 404 permitting trends of the past 7 years continue.

According to the KIRPC 2010 Comprehensive Economic Development Strategy (CEDS), the region seeks to achieve a modernized road and rail network with condition and connectivity improvements to roads and railways to better serve new and expanding economic sectors in addition to expanded access to surrounding regions. A number of the state and U.S. highways connect the region with important markets and allow for industrial growth. The KIRPC Region contains several industrial parks ranging from fully developed to shovel-ready and informally planned (KIRPC, 2010).

The highest priority short-term development objectives include significant improvements to water, sewer and drainage systems, transportation infrastructure, housing, and community services. Water, sewer and drainage improvements will require the construction of new facilities and systems in addition to upgrades and expansion of existing utilities to industrial sites and future development locations (KIRPC, 2010).

Additionally, this region will continue to pursue growth in wind power and agricultural ventures which the region already supports (KIRPC, 2010). Along with northern portions of the Middle Wabash SA and western portions of the Upper Wabash SA, the region's wind energy farms comprise the world's largest concentration of turbines consisting of the Benton County, Fowler Ridge, Purdue Energy Park, Meadow Lake and Hoosier Wind Farms. The region's goal is to be a global leader in wind energy production (KIRPC, 2010).

2.10 Offsets to Threats

IDNR will apply the same restoration, enhancement and/or preservation approaches to help offset the predominant threats in the Kankakee SA that were stated in the statewide portion of the CPF. The SA goals and objectives further define the general types and locations of the aquatic resources IDNR will provide as compensatory mitigation based upon identified threats, historic loss and current conditions. See **Appendix C** for a summary of offsets per major anthropogenic category and a general matrix of offset measures for each of the predominant threats to aquatic resources throughout the SA and the state.

ELEMENT 3. HISTORIC AQUATIC RESOURCE LOSS

The Kankakee SA's historic aquatic resources were comprised of a diverse mix of natural aquatic community types. Although it's estimated that approximately 65% of the SA was forested, Indiana's largest natural prairie communities were found in this SA.

Over 200 years ago, prior to European settlement, the Grand Kankakee Marsh spanned across nearly 500,000 acres and eight counties of Indiana and was one of the largest wetlands in the continental United States (Grand Kankakee Marsh: U.S. FWS Division of Conservation Planning, 2011). Existing within the Kankakee River Basin, the Grand Kankakee Marsh was once home to one of the richest wildlife sources in North America (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013).

Following the Civil War, agriculture was in high demand and the Grand Kankakee Marsh was drained for its fertile soil; ditches were excavated and wetlands were drained to the Kankakee River (Kankakee River: IDNR). By 1923, nearly 250 miles of the Kankakee River were straightened and dredged into what is now a 90 mile long ditch; these draining practices drastically decreased the migratory bird population within the United States (Everglades of the North- The Story of the Grand Kankakee Marsh, 2013). Today, less than 30,000 acres, or 6%, of the Grand Kankakee Marsh exists within the Kankakee Watershed due to human alterations (The Kankakee River Valley: IDNR, 1997).

Due to extensive aquatic resource loss within the Kankakee SA, the understanding of the regions aquatic resources and the natural communities in which they existed is best reconstructed by evaluating the identified Natural Regions and Sections and their natural aquatic communities within

each respective Region and Section. **Figure 57**, depicts each Natural Regions and Sections located within the Kankakee SA as identified within the Natural Regions of Indiana journal. In addition to the natural communities, the utilization of studies on Indiana’s historic vegetative cover and mapped hydric and partially hydric soils provide further insight into the general location and makeup of the historic aquatic resources that existed prior to early European settlement (**Table 39**). The table details the SA’s estimated land cover percentages for each region and section, identified natural communities, estimated hydric and partially hydric soils, and estimated forest cover.

Natural Region(s)	Natural Region: Section(s)		Natural Region Community Types	Hydric Soils		Partially Hydric		Pre-Settlement Forest Cover
	Name	% Cover		Acres	% Cover	Acres	% Cover	% Forested
Grand Prairie	Kankakee Sand	29.17	Predominantly prairie and savanna; wet prairie, marsh, swamp, wet sand flat, and wet muck flat; predominantly oak forest (eastern), oak flatwoods (dunal swales)	666,411	34.86	383,877	20.08	32.85
	Kankakee Marsh	20.03	Predominance of marsh, lake, and wet prairie communities					
	Grand Prairie	22.34	Dry prairie, wet prairie, savanna, marsh, pond, bog (rare), and forest (riparian and oak groves); Typical streams low-gradient and silty					
Northern Lakes	Northern Lakes	18.57	Bog, fen, marsh, prairie, sedge meadow, swamp, seep spring, lake (Wet sand flats and muck flats), and various deciduous forest types; Typical streams are clear, medium to low-gradient, sandy gravel beds					
Northwestern Morainal	Valparaiso Moraine	9.9	Predominantly forested, prairie (western); fen, bog, lake, marsh, savanna, seep spring, and swamp					

Table 48. The historic natural community composition for the Kankakee Service Area based upon the natural region and section

Kankakee Service Area Natural Regions and Sections

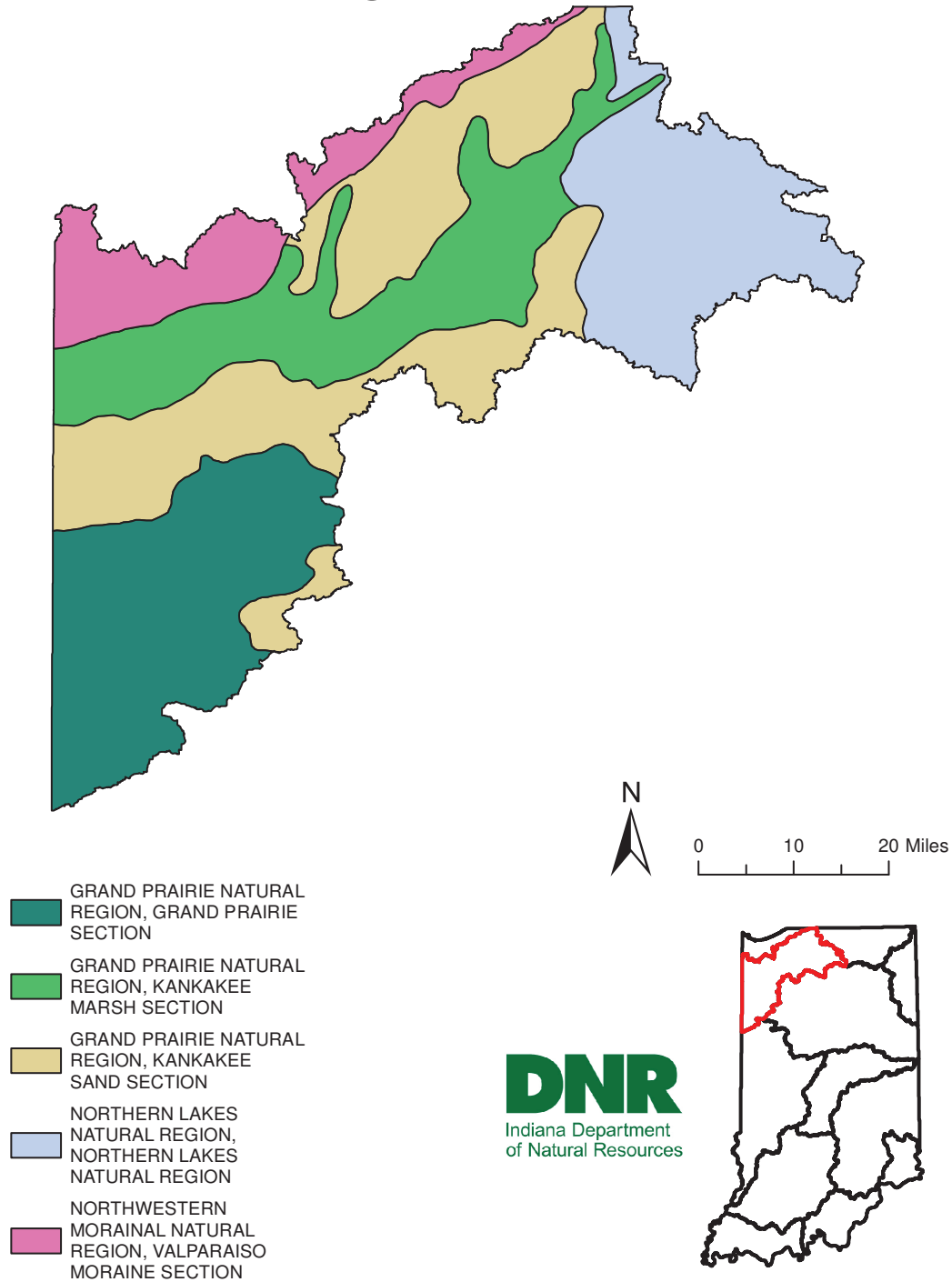


Figure 57. Natural regions and sections for the Kankakee Service Area (Homoya, Abrell, Aldrich, & Post, 1985)

ELEMENT 4. CURRENT AQUATIC RESOURCE CONDITIONS

4.1 Streams and Rivers

GIS analysis of 303(d) category 4A and 5 impaired streams (IDEM-IR, 2016) indicates there are currently 2,759 miles of category 4A impaired streams and 1,476 miles of category 5 impaired streams documented within the SA. IDEM reported E. coli (2,835 miles), impaired biotic communities (653 miles), PCBs in fish tissue (550 miles), dissolved oxygen (139 miles), nutrients (24 miles), chloride (31 miles), and pH (3 miles) as current stream impairments within the SA (IDEM-IR, 2016). There are stream reaches in which multiple impairments may occur; therefore there is some overlap with the impaired stream miles.

As of 2014, IDEM conducted QHEI assessments of 235 stream reaches within the SA (**Table 49 and Figure 58**) (IDEM OWQ, 2014). Of the stream and river habitat reaches assessed, only 4.41% are capable of supporting a balanced warm water community.

QHEI Score Ranges	Narrative Rating	Count	Percent of Total
<51	Poor Habitat	192	65.08
51-64	Habitat is partially supportive of a stream's aquatic life design	90	30.51
>64	Habitat is capable of supporting a balanced warm water community	13	4.41
	Total	295	100%

Table 49. IDEM Overall QHEI scores for Kankakee SA, 1991 – 2014 (IDEM OWQ, 2014)

As discussed in the statewide portion of the CPF, the functions and services provided by forests are important to the ecological health of aquatic resources in all portions of the SA that were historically forested. Analysis of the 2011 NLCD indicates that the Kankakee SA ranks third least overall in forested cover density of all SA's at 10% of total area with approximately 187,261 acres, and is the SA with the fourth least percentage of forested cover with approximately 3.59% of 5,215,169 acres of forest cover statewide.

GIS analysis indicates that there are approximately 3,231,953 linear feet (612 miles) of stream located within 100 feet of agricultural fields. Under these criteria, the Kankakee SA has the third smallest ratio of these potentially restorable stream miles to square miles of SA at approximately 0.2 mile of potential restoration per one square mile, or one mile of potential restoration for every 4.88 square miles of SA.

Kankakee Service Area Qualitative Habitat Evaluation Index (QHEI) Scores

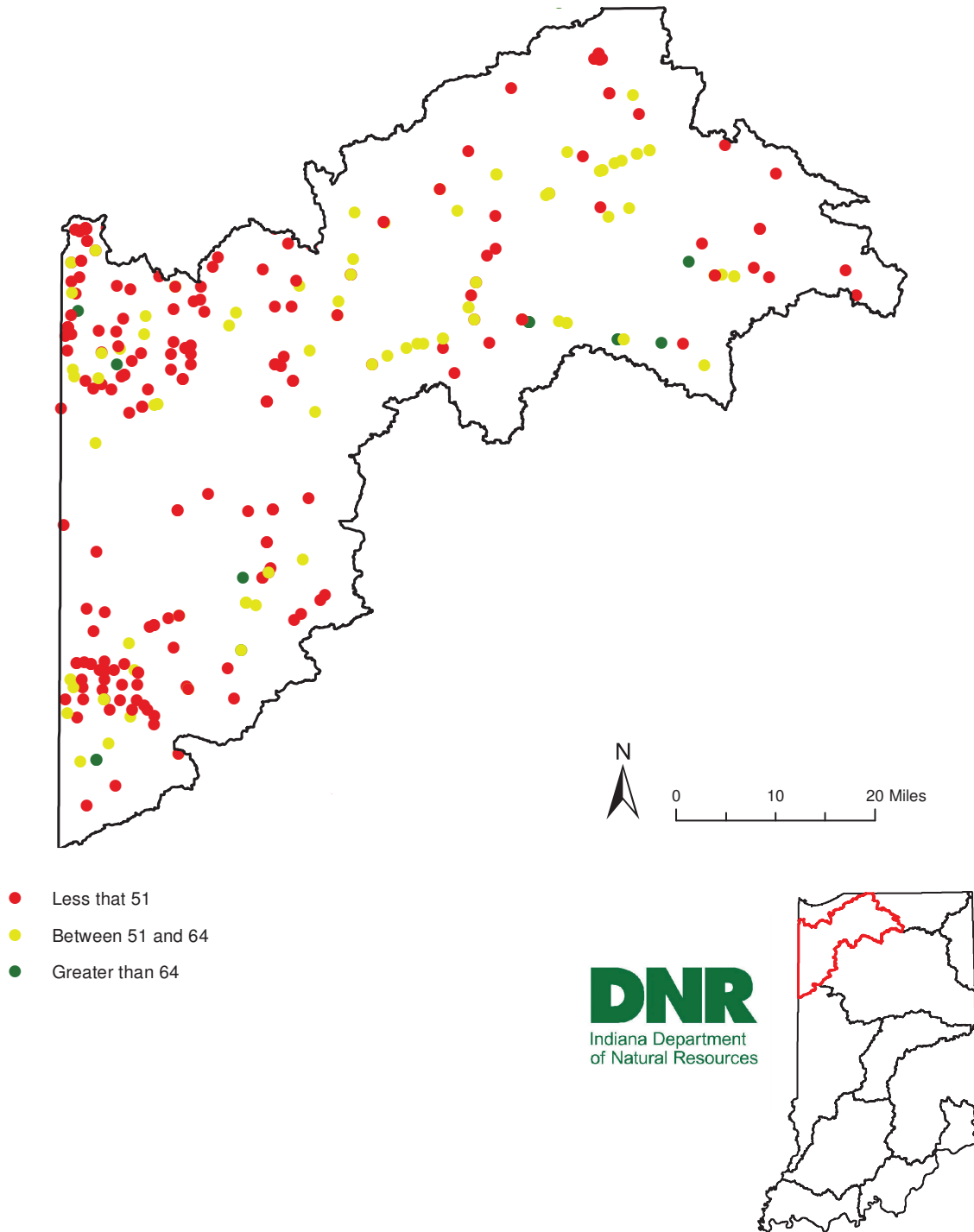


Figure 58. IDEM overall QHEI scores within the Kankakee SA; 1991 – 2014 (IDEM OWQ, 2014)

4.2 Wetlands

Analysis of the NWI in the Kankakee SA shows that there are approximately 23,489 acres of freshwater emergent wetland (PEM) and approximately 44,513 acres of combined freshwater forested (PFO) and scrub-shrub (PSS) wetlands, accounting for approximately 3.6% of the total SA acreage. All of the aquatic resource types from the NWI combined account for approximately 4.6% of the total SA (**Table 50 and Figure 59**).

Aquatic Resource Type	Sum of NWI Aquatic Resource ACRES in SA	Percent of Total NWI Aquatic Resource Acres in SA	Percent of SA Total Acres	Percent of Total State Area –Acres
Freshwater Emergent Wetland	23,489	26.61%	1.23%	0.10%
Freshwater Forested/Shrub Wetland	44,513	50.42%	2.33%	0.19%
Freshwater Pond	7,241	8.20%	0.38%	0.03%
Lake	9,776	11.07%	0.51%	0.04%
Riverine	3,266	3.70%	0.17%	0.01%
Grand Total	88,285	100.00%	4.62%	0.38%

Table 50. Acres and percentage of acres of aquatic resource types from NWI analysis (USFWS NWI, 2015)

Hydric and partially hydric soils account for 854,715 acres (**Figure 60**), or 44.7% of land cover within the SA, of which approximately 808,844 acres have the potential to be restored, accounting for 42.3% of the total SA. This was determined by mapping current hydric and partially hydric soils data with potentially restorable land cover types (e.g., cropland, pasture), excluding PFO, PSS and PEM wetlands from the NWI within agricultural land use. The Kankakee SA has the third highest percentage of recoverable wetland acres to total SA size of all SA's, and second overall in potentially restorable wetland acres of any SA. This is due to both a dominance of agricultural land uses and the SA's large size.

Kankakee Service Area National Wetlands Inventory

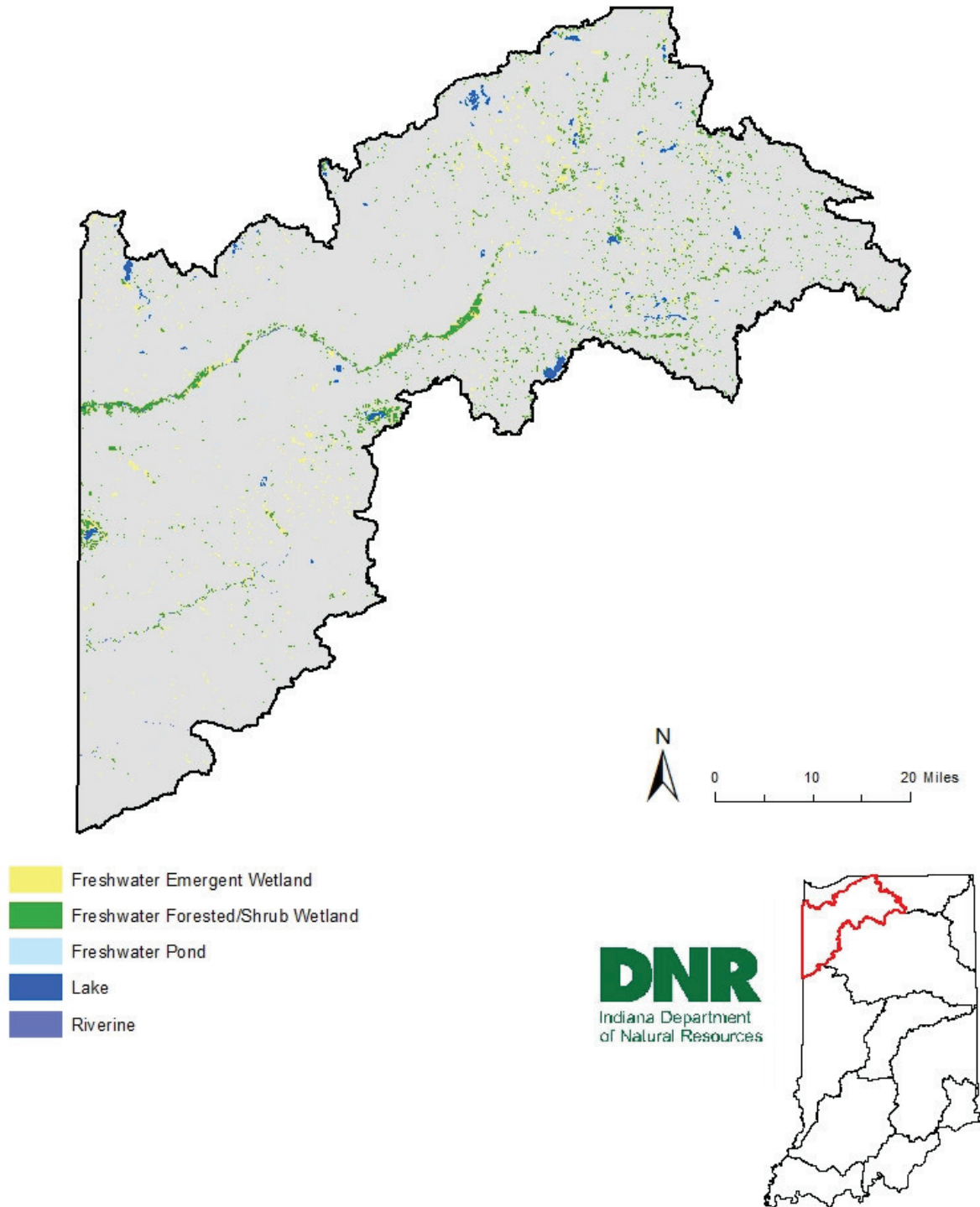


Figure 59. NWI within the Kankakee Service Area (USFWS NWI, 2015)

Kankakee Service Area Hydric Soils

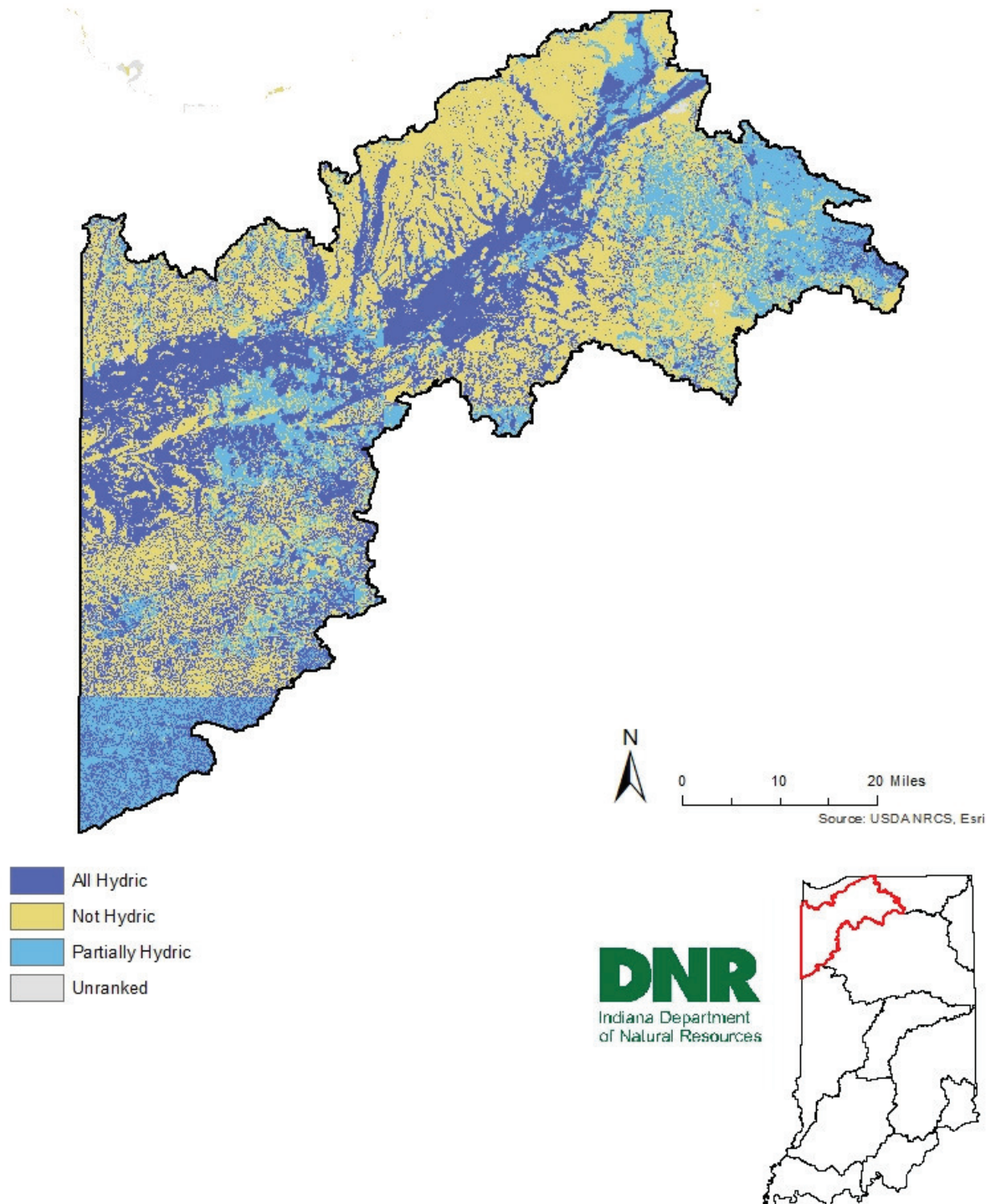


Figure 60. Hydric and partially hydric soils within the Kankakee Service Area (NRCS-USDA, 2016)

4.3 Concentrations of Potentially Restorable Wetlands and Streams

GIS hotspot analysis was conducted to document concentrations of the identified potentially restorable wetlands and streams. Hotspots account for 558,815 acres of potentially restorable wetlands within the SA. The watershed with the most hotspots of potentially restorable wetlands is Coon Creek-Mud Creek (HUC 071200020702 [Table 51]).

Hotspots account for 1,626,240 linear feet of these potentially restorable streams within the SA. The watershed with the most hotspots of potentially restorable streams is Brown Ditch (HUC 071200011307 [Table 52]). The watersheds with the highest concentrations of potentially restorable streams and wetlands (Tables 51 & 52) serve as the basis of identification of areas that have experienced the most recoverable aquatic resource loss within the SA. Figure 61 shows where these watersheds are located within the SA.

Approximately 3,176 acres of these hotspots of potential restorable wetlands are on IDNR-managed lands within the Kankakee SA. Approximately 8,968 linear feet of hotspots of potential restorable streams are on IDNR-managed lands within the Kankakee SA. Approximately 138,899 acres of hotspots of potentially restorable wetlands are adjacent to IDNR-managed lands in the SA. Approximately 17,099 linear feet of hotspots of potentially restorable streams are adjacent to IDNR-managed lands in the SA. Kankakee Fish and Wildlife Area is the IDNR-managed land within the Kankakee SA with the most adjacent acres of hotspots of potentially restorable wetlands (39,708 acres). Other IDNR-managed lands within the Kankakee SA with high amounts of adjacent acres of hotspots of potentially restorable wetlands include Jasper-Pulaski Fish and Wildlife Area (34,105 acres) and Willow Slough Fish and Wildlife Area (34,105 acres). The Jefvert Gamebird Habitat Area is the IDNR-managed land within the Kankakee SA with the most adjacent linear feet of hotspots of potentially restorable streams (5,545 linear feet).

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Wetlands (acres)
071200020702	Coon Creek-Mud Creek	22,768
071200011102	Wentworth Ditch-Knight Ditch	17,807
071200010302	Kline Rouch Ditch-Yellow River	16,022
071200020705	Yeagers Curve-Sugar Creek	14,621
071200020701	Upper Sugar Creek-Sugar Creek	13,331

Table 51. Watersheds in the Kankakee Service Area with the most hotspots of potentially restorable wetlands

HUC 12 Code	HUC 12 Name	Hotspots of Potentially Restorable Streams (linear feet)
071200011307	Brown Ditch	142,959
071200011204	Williams Ditch	133,344
071200020205	Carpenter Creek	105,667
071200020702	Coon Creek-Mud Creek	85,727
071200011103	Brown Levee Ditch-Kankakee River	76,071

Table 52. Watersheds in the Kankakee Service Area with the most hotspots of potentially restorable streams

Kankakee Service Area

Concentrations of Potentially Restorable Streams and Wetlands

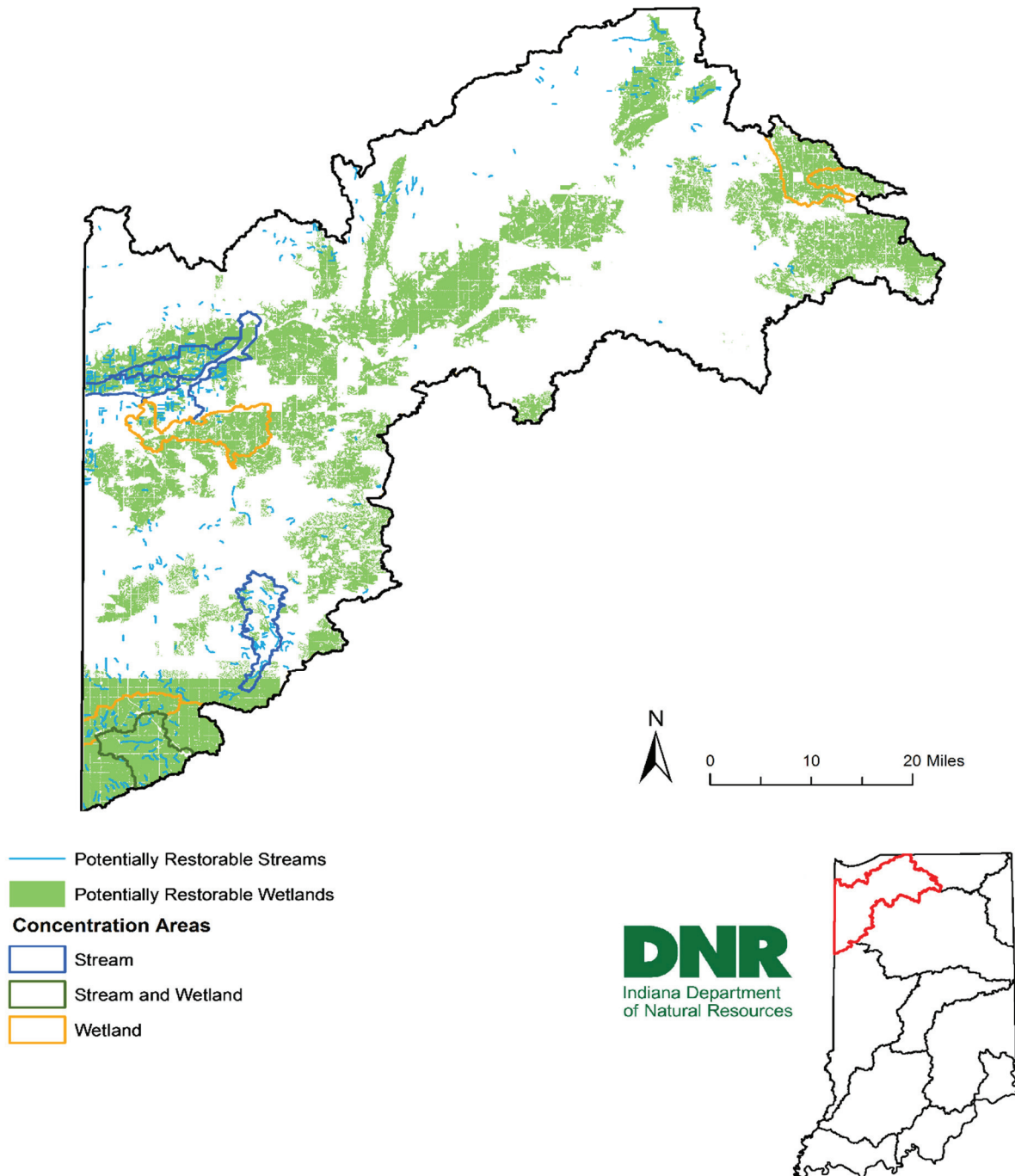


Figure 61. Concentrations of Potentially Restorable Streams and Wetlands in the Kankakee Service Area

4.4 Lakes, Reservoirs and Ponds

GIS analysis of 303(d) lake impairments in the Kankakee SA indicates there are 19 lakes currently documented having category 5 impairments, which measured using the National Hydrography Dataset (NHD) includes 3,287 acres with PCBs in fish tissue, 383 acres with phosphorus, and 166 acres with impaired biotic communities (IDEM-IR, 2016).

The 2011 NLCD identifies approximately 13,110 acres of open water which accounts for 0.7% of the SA. This varies slightly from the NWI which identifies approximately 7,241 acres of freshwater pond comprising 0.4% of the SA, and 9,776 acres of lake comprising 0.5% of total SA acres. Of these open waterbodies, GIS analysis identifies 51 natural public freshwater lakes (PFL) (IC 14-26-2-1.5) within the SA which is 12% of the PFL's as identified by the Indiana Natural Resource Commission list of public freshwater lakes as of June 2011 (IN NRC, 2011). Additionally, GIS analysis indicates that approximately 1,567 acres of PFO, PSS and/or PEM from the NWI are contiguous with the boundary of PFL's as identified in the IDNR DOW's GIS data within the SA (IDNR DOW PD, 2016). IDNR will remain up to date with PFL and reservoir condition data from sources such as IDEM, the Indiana Clean Lakes Program, watershed management plans, lake associations and the like as the landscape watershed approach is utilized to identify aquatic resource needs within the SA.

4.5 Ground Water and Surface Water Interaction

The data presented in this section will help identify potential areas in need of increased ground water recharge and/or identifying sensitive aquifers in need of increased buffering and protection from potential contamination threats.

Analysis of the near surface aquifer recharge rate data from IGS (Letsinger S. L., 2015) for the Kankakee SA shows that approximately 75% of the shallow unconsolidated aquifers receive between six to nine inches of ground water recharge annually (**Table 53**).


Recharge Rate	Inches/Year	Square Miles	Percent of Calumet-Dunes SA
 Low	14	0.08	0.003%
	13	0.05	0.002%
	12	0.35	0.01%
	11	2.33	0.08%
	10	19.42	0.65%
	9	252.80	8.48%
	8	1,077.11	36.11%
	7	467.12	15.66%
	6	414.36	13.89%
	5	404.95	13.58%
	4	215.71	7.23%
	3	80.16	2.69%
	2	31.87	1.07%
	<2	16.24	0.54%

Table 53. Approximate ground water recharge rates in the Kankakee Service Area (Letsinger S. L., 2015)

Analysis of the IGS near surface aquifer sensitivity mapping (Letsinger S. , 2015) indicates that approximately 93% of the Kankakee SA near surface aquifers are in the moderate to high range for sensitivity to contamination (**Table 54**). The aquifer sensitivity reflects the middle upper range of aquifer recharge rates.

Sensitivity	Square Miles	Percent of Total Acre
Very High	43	1%
High	2,152	72%
Moderate	621	21%
Low	164	5%
Very Low	3	0.1%

Table 54. Ground water sensitivity distribution in the Kankakee Service Area (Letsinger S. , 2015)

Analysis of the IDNR Division of Water's Water Rights Section 2015 significant water withdrawal facilities data shows the Kankakee SA is seventh most among SA's for registered capacity of surface water withdrawal with a 2015 withdrawal capacity of 25,466 MGD (**Figure 62**) (IDNR DOW, 2016). Agricultural irrigation accounts for approximately 42% of registered withdrawal capacity followed by energy production with approximately 32% of total capacity.

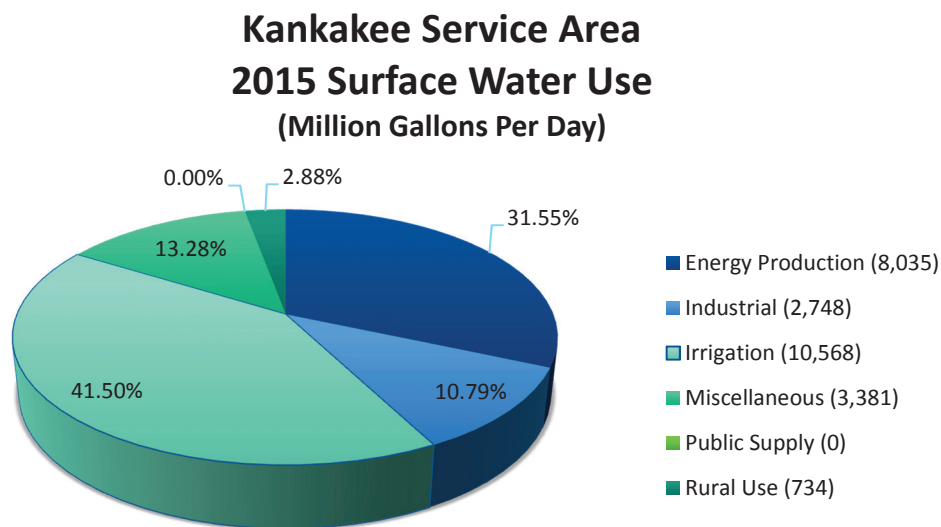


Figure 62. 2015 surface water usage in the Kankakee Service Area (IDNR DOW, 2016)

Significant ground water withdrawal in the Kankakee SA is the fifth most of any SA with a 20,654 MGD registered capacity (**Figure 63**). Public water supply and agricultural irrigation combined account for approximately 84% of registered ground water withdrawal capacity in the SA.

Kankakee Service Area 2015 Groundwater Use (Million Gallons Per Day)

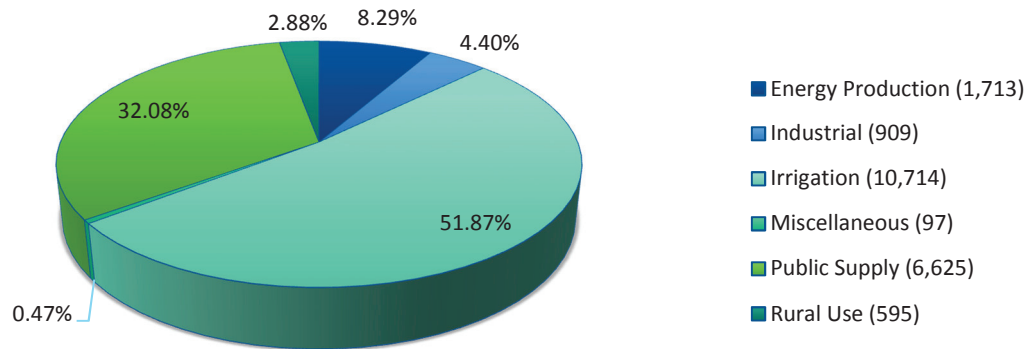


Figure 63. 2015 groundwater usage in the Kankakee Service Area (IDNR DOW, 2016)

4.6 High Quality Aquatic Resources and Natural Communities

In addition to previous eco and natural region descriptions of this SA, other high quality natural communities currently documented in the Natural Heritage Database within the Kankakee SA include, but are not limited to acid bog, circumneutral bog, fen, forested swamp, shrub swamp, marsh, inland coastal plain marsh, muck flat, sedge meadow, wet prairie, and wet sand prairie in addition to many other transitional, mixed and upland communities.

There are currently six amphibian species, 44 bird species, three fish species, 12 mammal species, three mollusk species, and nine reptile species listed as SGCN within the Indiana SWAP Kankakee Planning Region (SWAP, 2015).

ELEMENT 5. AQUATIC RESOURCE GOALS AND OBJECTIVES

Aquatic resource goals and objectives identified in the statewide CPF also apply to the Kankakee SA. The following aquatic resource goals and objectives apply specifically to the Kankakee SA based on 404 permitted impact trends, predominant threats, historic loss, current impaired and high quality aquatic resource conditions, habitats and SGCN, and current and future priority conservation areas. The general amounts of aquatic resources IDNR will seek to provide will depend on ILF credit demand.

1. Restoration, enhancement and/or preservation of aquatic resources that will help offset current and anticipated threats within the SA.
2. Re-establishment of historic aquatic resources that have experienced high concentrations of loss, fragmentation and/or impairment, such as the identified concentrations of potentially restorable streams and wetlands to include any stream channel restoration needs.
3. Implement projects within and adjacent to current and future areas identified as conservation priorities by federal, state and local government entities, and non-governmental organizations (stakeholder involvement/conservation partnerships).
4. Preservation of rare and high quality aquatic resources; critical habitat for rare and endangered species; priority habitat for species of greatest conservation concern; and/or other areas meeting the requirements of 33 CFR §332.3(h).
5. Implement natural stream channel restorations in order to help offset chemical, physical and biological impairments and degradation resulting from anthropogenic activities to include considerations such as in-stream habitat, physical integrity, riparian cover, and/or potential removal or modification of dams.
6. Support critical habitat restoration for federal and state listed SGCN within and adjacent to aquatic resources while applying the SWAP identified conservation needs and actions in the Kankakee River Watershed Planning Region where feasible.
7. Restoration of riparian and lacustrine wetlands to help offset threats to, and improve functions and services of, aquatic resources that will improve connectivity of formerly extensive wetland and natural lake complexes throughout the SA that have been degraded by, and/or lost to, conversion.
8. Implement stream and wetland restoration, enhancement and/or preservation projects to restore areas of the Grand Kankakee Marsh and the Kankakee River and tributary channels' natural geomorphology while reducing sediment loading.

ELEMENT 6. PRIORITIZATION STRATEGY

The four steps below present the prioritization criteria for mitigation site identification and selection. This prioritization strategy will be used for project selection within each SA. When prioritizing sites for mitigation projects, the following core criteria shall be utilized.

1. Mitigation site proposals must contain the ability to result in a successful and sustainable net gain and/or preservation of aquatic resource functions and services and/or result in no net loss of Indiana's aquatic resources.
2. Prioritization will be given to compensatory mitigation projects that provide the greatest benefit to the Kankakee SA, by providing the greatest lift in aquatic resource functions and services based upon the specific needs identified within the SA and/or watershed utilizing the watershed approach for site selection.
3. Project proposals will consider how to help offset the anthropogenic threats to aquatic resources, historic loss, and existing and future impairments while achieving IN SWMP goals and objectives, within the SA.
4. Other prioritization evaluation criteria may include, but are not limited to; cost, feasibility, size, proximity to other conservation lands or protected areas, connectivity or location with respect to corridors, human use value, and efficient long term maintenance.

In addition to the Core Criteria, information from conservation partners, landowners and additional stakeholders may also be utilized during the site selection process as they may have additional data or a pre-existing list of priority restoration projects. Ground investigations will be required to confirm or dismiss these datasets and determine the best locations for compensatory mitigation project sites.

Currently, the following watershed plans exist within the SA: Flat Lake (subwatershed) WMP, Lake of the Woods (subwatershed) WMP, NIRPC WMP, and Upper Iroquois WMP. However, IDNR will utilize the most current watershed planning information that is available as these plans are updated and/or new watershed plans are developed within this SA over the life of the program.

ELEMENT 7. PRESERVATION OBJECTIVES

When applicable under 33 CFR §332.3(h) of the Federal Mitigation Rule, preservation objectives within the Kankakee SA will include rare and high quality natural aquatic and riparian communities, waters having a significant contribution to ecological sustainability, and important habitat for SGCN while addressing the physical, chemical, or biological functions provided to the watershed that address critical conservation needs throughout the service area.. Additionally, there will likely be aquatic resource and habitat preservation and/or enhancement opportunities in conjunction with the primary objective of restoration to be determined on a per project basis and approved by the Corps/IRT.

ELEMENT 8. PUBLIC AND PRIVATE STAKEHOLDER INVOLVEMENT

Coordination with the Kankakee River Basin Commission may be a beneficial resource since it has a wide range of representation on the Commission from other local agencies and organizations.

Currently, the following land trusts exist within the SA: Woodland Savanna Land Conservancy, Trillium Land Conservancy, Wood-Land-Lakes RC&D Council, LaPorte County Conservation Trust, ACRES Land Trust, and NICHES Land Trust. There is the potential for land trusts to dissolve, adjust their geographical boundaries, and for new land trust organizations to be created within the SA. IDNR will work with the land trusts that exist in the SA over the life of the program

Additional stakeholders' interest and potential conservation partnerships specific to the Calumet-Dunes SA, and in which IDNR is an interested party include, but are not limited to the following organizations and/or initiatives:

- Kankakee River Basin Commission (KRBC)
- Kankakee-Iroquois Regional Planning Commission (KIRPC)
- Michiana Area Council of Governments (MACOG)
- Illinois state and local government entities
- USGS Indiana Water Science Center
- USGS Illinois Water Science Center
- Active Watershed Groups and appropriate Watershed Management Plans

- Upper Midwest and Great Lakes, and Eastern Tallgrass Prairie and Big Rivers Landscape Conservation Cooperatives
- Municipal and County governmental entities
- Municipal Separate Storm Sewer Systems (MS4) Communities
- Indiana Lakes Management Society
- Kankakee River Awareness Program

Currently known public, private and non-profit conservation priority areas as identified by the 2015 IWPP (IWPP, 2015) are shown in **Figure 64** below.

ELEMENT 9. LONG TERM PROTECTION AND MANAGEMENT

Long term protection and management strategies will be conducted in the same manner per SA as outlined in the statewide CPF.

ELEMENT 10. PERIODIC EVALUATION AND REPORTING

Periodic evaluation and reporting on the progress of IN SWMP will be conducted in the same manner per SA as outlined in the statewide CPF.

Kankakee Service Area High Priority Aquatic Resource Conservation Sites

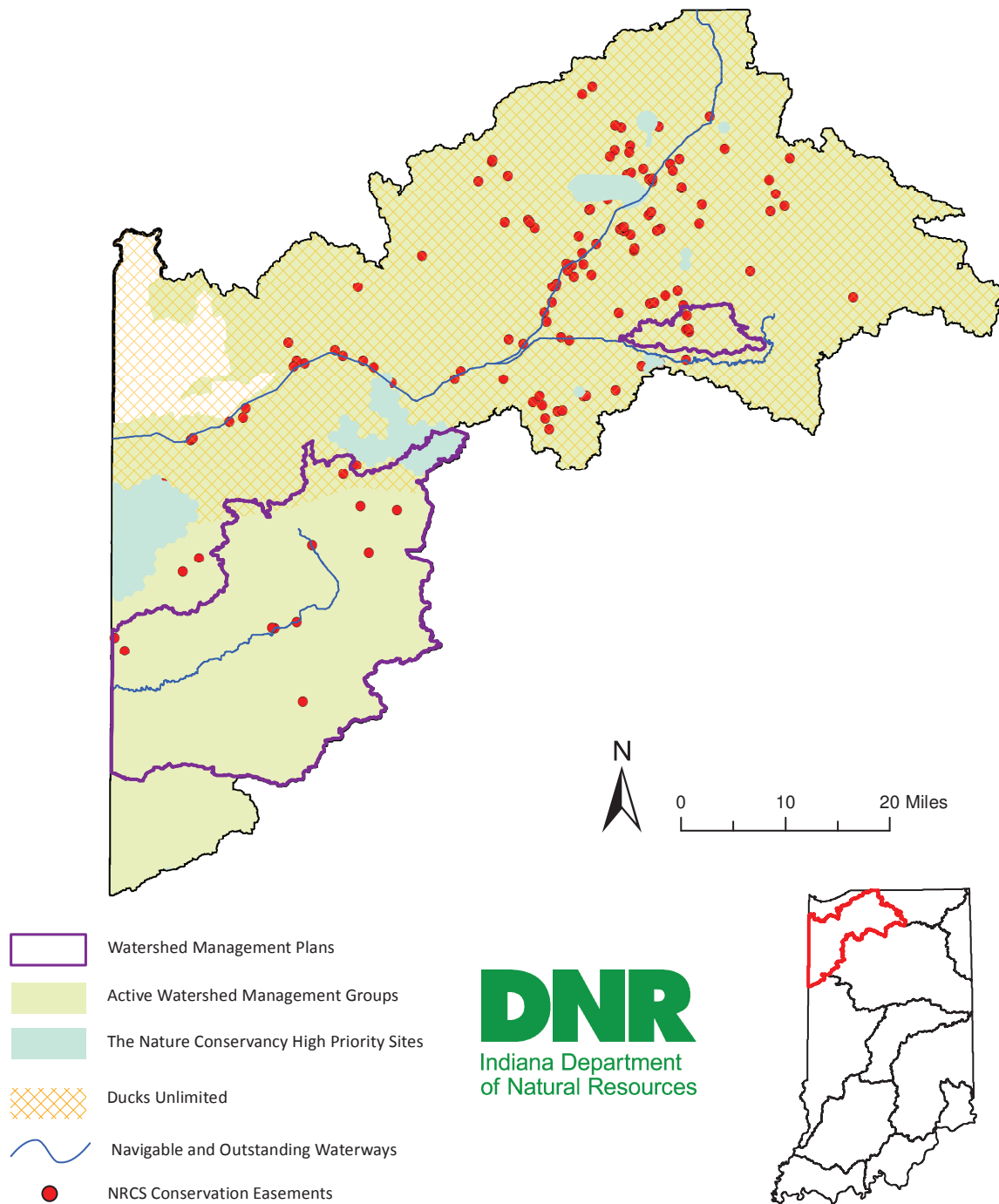


Figure 64. Priority aquatic resource conservation groups and sites within the Kankakee Service Area (IWPP, 2015)